



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

10/562,369

07/10/2006

Peter John Hastwell

13004.4

6262

7590 06/23/2009  
Brinks Hofer Gilson & Lione  
One Indian Square  
Suite 1600  
Indianapolis, IN 46204-2033

EXAMINER

BHAT, NARAYAN KAMESHWAR

ART UNIT

PAPER NUMBER

1634

MAIL DATE

DELIVERY MODE

06/23/2009

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/562,369	<b>Applicant(s)</b> HASTWELL ET AL.	
	<b>Examiner</b> NARAYAN K. BHAT	<b>Art Unit</b> 1634	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 16 March 2009.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-27, 29, 31-33 and 53-65 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-27, 29, 31-33 and 53-65 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                     | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

***Continued Examination Under 37 CFR 1.114***

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on March 16, 2009 has been entered.

***Claim Status***

2. This action is in response to papers filed on March 16, 2009.
3. Claims 1, 4, 7, 9 and 31-33 are amended. Claims 30 and 51-52 are cancelled. New claims 56-65 have been added. Claim amendments have been reviewed and entered.
4. Previous objections and rejections under 35 USC 112 Second Paragraph of claim 29 have been withdrawn in view of claim amendments.
5. Claims 1-27, 29, 31-33 and 53-65 are pending in this application and are under prosecution.

***Claim Rejections - 35 USC § 103***

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

Art Unit: 1634

invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

8. Claims 1-8 and 53-65 are rejected under 35 U.S.C. 103(a) as being unpatentable over McEntee et al (USPGPUB NO 2004/0050701 filed Sep. 13, 2002) in view of Paolini et al (USPGPUBNO. 2002/0131147, published Sep. 19, 2002).

Regarding claims 1, 4 and 7, McEntee et al teaches a method of manufacture by micrometer and nanometer scale spatially selective deposition of chemical substances on a substrate, the method including the steps of defining at least one region on the substrate by forming an electrostatic charge on that region which is different from the electrostatic charge on other regions of the substrate (Fig. 2B, # 134, paragraph 0060, step 'a' of the instant claim).

McEntee et al teaches electrostatically guiding droplet placement to the substrate (paragraph 0041) and further teaches droplet comprise emulsion (paragraph 0097).

McEntee et al further teaches emulsion includes an electrically insulative continuous

Art Unit: 1634

phase (paragraph 0097) and an electrically charged discontinuous phase (paragraphs 0097 and 0098). McEntee et al further teaches that the component to be selectively deposited comprises electrically charged discontinuous phase (paragraph 0097).

McEntee et al do not teach about emulsion comprising a surfactant having a first part which is compatible with the continuous phase and the second part which is not compatible with the discontinuous phase and not significantly reducing the volume resistivity of the continuous phase.

McEntee et al also teaches directing the discontinuous phase of the emulsion to a region by attraction to or repulsion from the electrostatic charge on the region (Fig. 4A, droplet # 144, deposition site # 134 and paragraphs 0067 and 0098, step 'c' of the instant claim).

McEntee et al also teaches that the substrate (Fig. 1, # 110) comprises a support, a conductive layer on the support (Fig. 1, # 120), a photoconductive layer (Fig. 1, #130). McEntee et al also teaches that the photoconductive layer is an electric insulator in the absence of light (i.e., a dielectric layer) and further teaches that the said dielectric layer will hold electric charge disposed on the conductive layer (paragraphs 0042 and 0043). McEntee et al also teaches that the substrate comprises additional layers for chemical and biological array fabrication (paragraphs 0010, 0052, lines 5-7 and 0108). Instant specification defines chemically functional layer is intrinsically reactive (paragraph 0057). The additional layer of McEntee et al for chemical array fabrication is the chemically functional layer on the dielectric layer as defined in the instant specification.

Additional steps recited in claims 4 and 7 taught by McEntee et al are discussed below.

McEntee teaches a method for insitu synthesis of DNA and RNA wherein array substrate is exposed to multiple chemical species sequentially thus causing a chemical reaction in the at least one region (paragraph 0108, step'd' of the instant claims 4 and 7) and further teaches a washing step, i.e., removing the emulsion (paragraph 0108, step 'e' of the instant claims 4 and 7). McEntee et al further teaches carrying out subsequent steps of the stepwise reaction emulsion (paragraph 0108 and pg. 17, section 39, step 'f' of the instant claim 7).

Regarding claim 2, McEntee et al teaches that the component to be selectively deposited is selected from the group comprising a DNA, i.e., a bio-active agent, chemical or biochemical material, a reagent and biological probes (paragraphs 0033, 0041, 0043 and 0088).

Regarding claim 3, McEntee et al teaches the step of carrying out repetition of steps (a) to (c) as recited in claim 1, to provide a stepwise deposition process at the same or alternative positions on the substrate (paragraph 0108, pg. 17, McEntee et al , claim 39).

Regarding claim 5, McEntee et al teaches the step of carrying out repetition of steps (a) to (e) as recited in claim 4, to provide a stepwise deposition process at the same or alternative positions on the substrate (paragraph 0108, pg. 17, section 39).

Regarding claim 6, McEntee et al teaches the step of flooding further with a reagent wherein reaction of the further reagent only occurs where the spatially selective deposition had previously occurred (paragraph 0108).

Regarding claim 8, McEntee et al teaches a method wherein the step of applying the emulsion to the substrate includes the step of applying a coating of opaque material surrounding the deposition site on the substrate, which is of other liquid before applying the emulsion (Fig. 3, Deposition site # 133, Surrounding area # 136, and paragraph 0073).

Regarding claims 56, 59 and 62, McEntee et al teaches that the support is selected from the group comprising polymeric material (paragraph 0087).

Regarding claims 57, 60 and 63, McEntee et al teaches that the conductive layer is selected from the group comprising a sputtered layer of metal (paragraph 0042).

Regarding claims 58, 61 and 64, McEntee et al teaches that the photoconductor layer is selected from the group comprising zinc oxide, alloys of selenium such as selenium-tellurium (paragraph 0043). McEntee et al also teaches that the photoconductive layer is the dielectric layer in the absence of light (paragraph 0042) and also as defined in the instant claim 65.

Regarding claim 65, McEntee et al teaches that the dielectric layer is a photoconductive layer (paragraph 0042).

Regarding claims 1, 4 and 7, McEntee et al do not teach about emulsion comprising a surfactant having a first part which is compatible with the continuous phase and the second part which is not compatible with the discontinuous phase and

Art Unit: 1634

not significantly reducing the volume resistivity of the continuous phase. However, emulsion comprising a surfactant having a first part which is compatible with the continuous phase and the second part which is not compatible with the discontinuous phase and not significantly reducing the volume resistivity of the continuous phase was known in the art at the time of the claimed invention was made as taught by Paolini et al.

Paolini et al teaches that the emulsion comprising a surfactant having a first part which is compatible with the continuous phase and a second part which is compatible with the discontinuous phase the surfactant being selected to not significantly reduce the volume resistivity of the continuous phase (paragraph 0041).

Regarding claims 53-55, Paolini et al teaches that surfactant is selected from the group comprising anionic, cationic, non-ionic or amphoteric compounds, polymer surfactant materials or phospholipids (paragraph 0041).

Paolini et al also teaches that surfactant assists in stabilizing the droplet (paragraph 0041). McEntee et al teaches generation of droplets and controlling the volume of the droplet to deposit on the surface at predetermined location (paragraph 0015) and thus in need of stabilization of the droplet to deliver the chemicals to the deposition site in smaller volume. Having surfactant stabilized emulsion droplet of Paolini et al, McEntee et al are able to increase the number of arrays per unit area by depositing smaller droplets on the surface, thus meeting their long felt need for generating higher density array (e.g., McEntee et al paragraph 0015).



It would have been prima facie obvious to one having the ordinary skill in the art at the time the invention was made to modify the emulsion of McEntee et al with an emulsion comprising surfactant of Paolini et al with a reasonable expectation of success, with the expected benefit of having a surfactant in the emulsion to stabilize the droplet as taught by Paolini et al (paragraph 0041).

9. Claims 9-27, 29 and 31-33 are rejected under 35 U.S.C. 103(a) as being unpatentable over McEntee et al (USPGPUB NO 2004/0050701 filed Sep. 13, 2002) in view of Montgomery (USPN 6,280,595 issued Aug. 28, 2001) further in view of Paolini et al (USPGPUBNO. 2002/0131147, published Sep. 19, 2002).

Regarding claim 9, McEntee et al teaches a method of forming a DNA array on a substrate, the method including the steps of preparing a substrate with a surface (Fig. 1, substrate # 110, paragraph 0110) but are silent about surface functional groups protected by a removable protecting group.

McEntee et al further teaches defining at least one region on the substrate by forming an electrostatic charge on that region which is different from the electrostatic charge on other regions of the substrate (Fig. 2B, # 134, paragraph 0060, step 'b' of the instant claim).

McEntee et al teaches applying emulsion to the substrate that includes an electrically insulative continuous phase (paragraph 0097) and an electrically charged discontinuous phase (paragraphs 0097 and 0098). McEntee et al are silent about chemical emulsion comprising a surfactant having a first part which is compatible with

Art Unit: 1634

the continuous phase and the second part which is not compatible with the discontinuous phase and not significantly reducing the volume resistivity of the continuous phase.

McEntee et al also teaches depositing the discontinuous phase of the emulsion to the at least one region by attraction by the electrostatic charge on the region and optionally by the use of bias voltage to reduce deposition in non-required regions (paragraphs 0098 and 0099, step 'd' of the instant claim).

McEntee et al also teaches a method for insitu synthesis of DNA and RNA wherein array substrate is exposed to multiple chemical species sequentially thus causing a chemical reaction in the at least one region (paragraph 0188), but are silent about causing chemical de-protection.

McEntee et al further teaches a washing step, i.e., removing the emulsion (paragraph 0188, step 'f' of the instant claim). McEntee et al further teaches carrying out subsequent steps of the stepwise reaction emulsion (paragraph 0188 and pg. 17, section 39 step 'g' of the instant claim).

McEntee et al also teaches that the substrate (Fig. 1, # 110) comprises a support, a conductive layer on the support (Fig. 1, # 120), a photoconductive layer (Fig. 1, #130). McEntee et al also teaches that the photoconductive layer is an electric insulator in the absence of light (i.e., a dielectric layer) and further teaches that the said dielectric layer will hold electric charge disposed on the conductive layer (paragraphs 0042 and 0043). McEntee et al also teaches that the substrate comprises additional layers for chemical and biological array fabrication (paragraphs 0010, 0052, lines 5-7

Art Unit: 1634

and 0108). Instant specification defines chemically functional layer is intrinsically reactive (paragraph 0057). The additional layer of McEntee et al for chemical array fabrication is the chemically functional layer on the dielectric layer as defined in the instant specification.

Regarding claim 10, McEntee et al teaches insitu oligonucleotide synthesis (paragraph 0043), which comprises the subsequent steps of the stepwise coupling process are those in the phosphoramidite chemistry for synthesis of oligodeoxynucleotides.

Regarding claims 11-23, McEntee et al teaches an emulsion (McEntee et al, paragraph 0097) but do not teach about its volume resistivity, viscosity and details of method of producing emulsion.

Regarding claim 24, McEntee et al teaches the step of defining at least one region on the substrate by forming an electrostatic charge on that region includes the step of image reversal to enable deposition in non-charged regions (paragraphs 0056 and 0106).

Regarding claim 25, McEntee et al teaches the step of formation of the electrostatic image pattern is by electrostatic means wherein the substrate is a photoconductor (Fig. 2B, # 130, paragraph 0058) and the formation of the electrostatic field is by charging and subsequent discharging by selective illumination (Fig. 2A, Illumination # 150 and paragraphs 0010 and 0058).

Regarding claims 26-27, McEntee et al teaches aqueous washing step to remove emulsion, but do not teach about chemical deprotecting agent.

Regarding claim 29, McEntee et al do not teach about type of surfactant.

Regarding claim 31, McEntee et al teaches that the support is selected from the group comprising polymeric material (paragraph 0087).

Regarding claim 32, McEntee et al teaches that the conductive layer is selected from the group comprising a sputtered layer of metal (paragraph 0042).

Regarding claim 33, McEntee et al teaches that the photoconductor layer is selected from the group comprising zinc oxide, alloys of selenium such as selenium-tellurium (paragraph 0043).

Regarding claim 9, McEntee et al teaches the insitu synthesis of oligonucleotides (paragraphs 0043 and 0108), but are silent about the functional group on the substrate and chemical deprotecting at the deposited site. However, functional groups on the substrate to synthesize polymers and chemical deprotection at the deposited site was known in the art before the claimed invention was made as taught by Montgomery, who teaches a method for solid phase synthesis comprising a substrate with surface functional groups protected by a removable protecting group at a addressable electrode location (Fig. 1a, protectable functional group # L—p, Fig. 1b- after deprotection # L-NH<sub>2</sub>, Addressable location -#1, column 5, lines 57-67, step 'a' of claim 9). Montgomery further teaches applying potential to generate electrochemical reagents capable of deprotecting the protected chemical groups on the molecule (column 5, lines 30-56).

Regarding claim 26, Montgomery teaches scavenging agent to neutralize any residual chemical de-capping agent in the reaction region to prevent it from reacting in non-desired parts of the array.

Regarding claim 27, Montgomery teaches that chemical deprotection agent is sulfonic acid (column 21, lines 5-11).

McEntee et al and Montgomery teaches steps, 'a, b and d-f' recited in instant claim 9.

Montgomery also teaches that the electrochemical technique is well suited for synthesizing a variety of chemical sequences at known locations that is cost effective and practical and saving time (column 4, lines 28-38).

It would have been prima facie obvious to one having the ordinary skill in the art at the time the invention was made to use the electrochemical technique of Montgomery in the DNA array method of McEntee et al with the expected benefit of synthesizing a variety of chemical sequences at known locations that is cost effective and practical and saving time as taught by Montgomery (column 4, lines 28-38).

Regarding claim 9, McEntee et al and Montgomery are silent about McEntee et al are silent about emulsion comprising a surfactant having a first part which is compatible with the continuous phase and the second part which is not compatible with the discontinuous phase and not significantly reducing the volume resistivity of the continuous phase. However, emulsion comprising a surfactant having a first part which is compatible with the continuous phase and the second part which is not compatible with the discontinuous phase and not significantly reducing the volume resistivity of the continuous phase was known in the art at the time of the claimed invention was made as taught by Paolini et al.

Paolini et al teaches that the emulsion comprising a surfactant having a first part which is compatible with the continuous phase and a second part which is compatible with the discontinuous phase the surfactant being selected to not significantly reduce the volume resistivity of the continuous phase (paragraph 0041).

Paolini et al also teaches that surfactant assists in stabilizing the droplet (paragraph 0041). McEntee et al and Montgomery teach generation of droplets and controlling the volume of the droplet to deposit on the surface at predetermined location (paragraph 0015) and thus in need of stabilization of the droplet to deliver the chemicals to the deposition site in smaller volume. Having surfactant stabilized emulsion droplet of Paolini et al, McEntee et al and Montgomery are able to increase the number of arrays per unit area by depositing smaller droplets on the surface, thus meeting their long felt need for generating higher density array (e.g., McEntee et al paragraph 0015).

It would have been prima facie obvious to one having the ordinary skill in the art at the time the invention was made to modify the emulsion of McEntee et al and Montgomery with emulsion comprising surfactant of Paolini et al with the expected benefit of having a surfactant in the emulsion to stabilize the droplet as taught by Paolini et al (paragraph 0041).

McEntee et al, Montgomery and Paolini et al teaches steps, 'a-f' recited in instant claim 9.

Regarding claims 11-23, McEntee et al in view of Montgomery teaches an emulsion (McEntee et al, paragraph 0097) but do not teach about its volume resistivity, viscosity and details of method of producing emulsion. However, production of two

Art Unit: 1634

phase emulsion and its properties were known in the art at the time of the claimed invention was made as taught by Paolini et al.

Regarding claim 11, Paolini et al teaches a two phase electrophoretic medium that includes a continuous phase emulsion of a volume resistivity of high resistivity of approximately greater than a million ohm-cm (paragraphs 0074 and 0089).

Regarding claim 12, Paolini et al teaches a continuous phase of the emulsion selected from mixture of hydrocarbons, aromatic hydrocarbons, silicone fluids (paragraphs 0020 005, 0076-0077).

Regarding claim 13, Paolini et al teaches the continuous phase of the emulsion is a highly viscous liquid (paragraph 0039).

Regarding claim 14, Paolini et al teaches that two phase electrophoretic medium wherein the discontinuous phase of the emulsion is non-aqueous and is substantially insoluble in the continuous phase (paragraphs 0008 and 0037).

Regarding claim 15, Paolini et al teaches a method wherein the discontinuous phase of the emulsion is selected from the group comprising a carrier liquid for a solid particle (paragraph 0008).

Regarding claim 16, Paolini et al teaches that the discontinuous phase of the emulsion is selected from the group comprising commercially available mixtures of hydrocarbons including Isopar (paragraph 0051).

Regarding claim 17, Paolini et al teaches that the emulsion further includes a charge control agent (paragraphs 0060 and 0084).

Regarding claim 18, Paolini et al teaches that wherein the charge control agent is selected from the group comprising an inorganic acid and its salts, an organic acid and its salts or an ionic or zwitterionic compound (paragraphs 0084-0089).

Regarding claim 19, Paolini et al teaches that wherein the charge control agent is selected from the group comprising metallic soaps, comprising a metal and an acid wherein the metal is selected from barium, calcium, zinc, chromium, aluminum, lead, manganese, iron, nickel and cobalt and the acid portion is a carboxylic acids, caproic acid, octanoic (caprylic) acid, capric acid, lauric acid, stearic acid, oleic acid, linolic acid (paragraph 0088).

Regarding claim 20, Paolini et al teaches that the emulsion comprises the discontinuous phase present in the range of about 40 to 95 % and continuous phase surrounds the discontinuous phase (paragraphs 0018-0019) thus teaching continuous phase is in the claimed range. Paolini et al also teaches that emulsion comprises surfactant 0.1 to 10% by weight (paragraph 0041) and charge control reagent (paragraphs 0083-0088). Paolini also teaches surfactant is also comprise charge control agent (paragraph 0088) thus teaching charge control agent is within the claimed range of percent by weight.

Regarding claims 21-23, Paolini et al teaches that the discontinuous phase has a droplet size of from about 1 nm to 100 microns (paragraphs 0046, 0054 and 0067), which meets the limitation of droplet size from 100 microns down to 0.2 microns (limitation of claim 21), from 500 nanometers down to about 50 nanometers (limitation of claim 22) and from about 200 nanometers down to 1 nanometer (limitation of claim 23).



Regarding claim 29, Paolini et al teaches that the surfactant is selected from the group comprising anionic, cationic, non-ionic or amphoteric compounds, polymer surfactant materials or phospholipids (paragraph 0041).

Paolini et al also teaches that two phase emulsion medium requires reduced processing time in hours rather than in days and also forms an electrophoretic medium of different thickness allowing lowered operating voltage and/or switching time (paragraphs 0048-0049).

It would have been prima facie obvious to one having the ordinary skill in the art at the time the invention was made to use the emulsion of Paolini et al in the DNA array method of McEntee et al and Montgomery with the expected benefit of having two phase emulsion medium requiring reduced processing time in hours rather than in days and forming an electrophoretic medium of different thickness allowing lowered operating voltage and/or switching time as taught by Paolini et al (paragraphs 0048-0049), thus also providing a detailed method of producing emulsion in hours in the method of McEntee et al and Montgomery.

***Response to remarks from the Applicants***

***Rejections under 35 USC § 103 (a)***

10. Applicant's arguments filed March 16, 2009 with respect to claims 1-8 being unpatentable over McEntee et al in view of Paolini et al have been fully considered but they are not persuasive for the following reasons.

Applicant's arguments are directed to McEntee et al not teaching emulsion as claimed and Paolini et al cure the deficiency of McEntee et al. Applicants have made the similar arguments pertaining to the teachings of McEntee et al and Paolini et al after the final office action. Those arguments have been addressed in the advisory action mailed March 5, 2009. Therefore repetitive arguments are not addressed again in this office action. Responses to the new arguments filed on March 16, 2009 are addressed below.

Applicants argue that McEntee teaching away from the use of any surfactants in the ionized droplets (pg. 14, paragraph 2). This argument is not persuasive because Paolini et al teaches emulsion comprising surfactant and further teaches that the surfactant stabilizes the droplet (paragraph) thus providing motivation to use a surfactant in the emulsion of McEntee et al.

Applicants further argue that there is no reason to combine McEntee et al with Paolini et al and the alleged combination uses impermissible hindsight (Remarks, pg. 14, last paragraph). This argument has been made before and addressed in the advisory action a copy of which is listed below.

"Argument of hindsight is not persuasive because it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the applicant's disclosure, such a reconstruction is proper (See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA

Art Unit: 1634

1971)). In the instant case, McEntee et al are interested in moving droplets to the deposition site using an electric field (paragraph 0014). Paolini et al are also interested in moving droplets using electric field (paragraph 0008). Since both McEntee et al and Paolini et al are interested in moving droplets using electric field, it would be obvious to combine the references."

As described above in section 8, McEntee et al teaches generation of droplets and controlling the volume of the droplet to deposit on the surface at predetermined location to produce high density array (paragraph 0015). Therefore, McEntee et al are in need of need of droplets in smaller volume to deliver the chemicals to the deposition site. Having surfactant stabilized emulsion droplet of Paolini et al, McEntee et al are able to increase the number of arrays per unit area by depositing smaller droplets on the surface, thus meeting their long felt need for generating higher density array (e.g., McEntee et al paragraph 0015). For these reasons arguments are not persuasive.

Applicants further argue that Paolini et al do not teach or suggest that emulsion can be used for selective deposition (Remarks, pg. 15, paragraph 1). This argument is not persuasive because as described above Paolini et al teaches that emulsion comprising surfactant stabilizes droplets, thus providing motivation to use said emulsion for selective deposition in the method of McEntee et al.

Applicants further argue that the mere fact that the two references are in the same general field does not render them combinable (Remarks, pg. 15, paragraph 2). This argument is not persuasive because the recent Supreme Court decision in *KSR Intl. Co. v. Teleflex Inc.* rejected the rigid approach of applying a strict TSM test as the

Art Unit: 1634

sole basis for obviousness and that the analysis for obviousness need not seek out precise teachings directed to the specific subject matter of a claim. Further the decision set forth that the analysis can take into account the inferences and creative steps that a person of ordinary skill in the art could employ and that a person of ordinary skill in the art is also a person of ordinary creativity, not an automaton. Further, the decision set forth that a combination of familiar elements according to known methods is likely to be obvious when it does no more than yield predictable results. Since Both McEntee et al and Paolini et al are delivering chemical/particles to the surface using the droplets, arguments are not persuasive.

Applicants further argue that emulsion of Paolini et al is in the gel form (Remarks, pg. 15, paragraphs 3 and 4, pg. 16). This argument has been addressed before in the advisory action.

Applicants further argue that the Examiner fail to establish any reasoning for surfactant that does not significantly reduces the volume resistivity of the continuous phase (Remarks, pg. 17, paragraph 2). This argument is not persuasive because Paolini et al teaches that the surfactant maintains high volume resistivity (paragraph 0089). It is maintained that the claimed emulsion is obvious over McEntee et al and Paolini et al barring secondary considerations.

Applicants further argue that the Examiner does not explain which layer in McEntee is the functional layer (Remarks, pg. 17, paragraph 3). This argument is not persuasive because as described above in section 8, McEntee et al teaches that the substrate comprises additional layers for chemical and biological array fabrication

Art Unit: 1634

(paragraphs 0010, 0052, lines 5-7 and 0108). Instant specification defines chemically functional layer is intrinsically reactive to deposit chemicals (paragraph 0057). The additional layer of McEntee et al for chemical array fabrication is the chemically functional layer on the dielectric layer as defined in the instant specification.

Applicants arguments regarding claims 9-27, 29 and 31-33 being unpatentable over McEntee et al, Paolini et al and Montgomery have been fully considered (Remarks pg. 18, paragraph 3, pg. 19, paragraphs 1 and 2), but they are not persuasive because these arguments have been made before and addressed in the advisory action.

Applicant's arguments regarding new claims 56-65 are directed to amended independent claims 1, 4 and 7 are patentable over the cited references and hence dependent claims are also patentable (Remarks, pg. 20, last paragraph). These arguments are not persuasive because as described above in section 8, said claims have been rejected over McEntee et al and Paolini et al.

McEntee et al, Paolini et al and Montgomery teaches method steps as claimed and therefore claimed invention is obvious over the cited prior art barring secondary considerations.

### ***Conclusion***

11. No claims are allowed.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Narayan K. Bhat whose telephone number is (571)-272-5540. The examiner can normally be reached on 8.30 am to 5 pm.

Art Unit: 1634

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, James (Doug) Schultz can be reached on (571)-272-0763. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/JD Schultz/

Supervisory Patent Examiner, Art Unit 1635

Narayan K. Bhat

Examiner, Art Unit 1634